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IN THE CLAIMS

The text of all pending claims, along with their current status, is set forth below in accordance with 37 C.F.R. § 1.121.

1. (*Currently amended*) A computer system for simulating a physical system comprising:

a processor;

memory ~~having~~ coupled to the processor; and

object-oriented software in a main simulation system stored in the memory, the object-oriented software configured to:

a) provide a logic interface ~~that enables a simulator user of the computer system~~ to dynamically construct logic to customize simulation of transport phenomena through a model of the physical system;

b) convert the constructed logic into corresponding object-oriented code during a simulation without intervention of the simulator user;

c) integrate, without intervention of the simulator user, the object-oriented code with the main simulation system which comprises a simulation data model and simulation algorithms, resulting in an integrated simulation system ~~without intervention of the simulator user~~, wherein the object-oriented code extends the simulation data model by creating new classes that inherit from the simulation data model, and the object-oriented code is configured to call functions of the integrated simulation system and use member data of the integrated simulation system; and

d) execute the integrated simulation system.

2. (*Previously presented*) The computer system of claim 1 wherein the constructed logic comprises facility management logic which is representative of steps used to simulate the monitoring and controlling of mechanical facilities associated with the physical system.

3. (*Original*) The computer system of claim 1 wherein the logic interface comprises a logic flow chart interface.

4. (*Previously presented*) The computer system of claim 3 wherein the logic flow chart interface comprises one or more of icons, arrows, menus, dialogs, toolbar buttons, and text to enable the simulator user of the computer system to build-up, edit and visualize facility management logic in the form of a flow chart.

5. (*Original*) The computer system of claim 3 wherein the logic flow chart interface comprises icons representing basic logic control constructs for looping, decision making, statement execution, and logic entry and exit.

6. (*Previously presented*) The computer system of claim 5 wherein icons that represent logic control mechanisms enable the simulator user of the computer system to construct customized logic flow charts.

7. (*Original*) The computer system of claim 1 wherein the logic interface comprises a text-based logic code interface.

8. (*Original*) The computer system of claim 7 wherein the text-based logic code interface comprises a graphical text editor for performing one or more of entering, modifying and deleting lines of alpha-numeric text.

9. (*Previously presented*) The computer system of claim 7 wherein the text-based logic code is a facility management control language automatically created from a logic flow chart.

10. (*Previously presented*) The computer system of claim 9 wherein the facility management control language is automatically converted into object-oriented-facility management code in the form of C++.

11. (*Currently amended*) The computer system of claim 9 wherein the facility management control language is an object-oriented language ~~with features and scope~~

~~suited to embody facility management logic~~ that is parsed prior to conversion into the object-oriented-facility management code to verify syntax.

12. (*Previously presented*) The computer system of claim 1 wherein the object-oriented code is facility management object-oriented code in the form of C++.

13. (*Currently amended*) The computer system of claim 1 wherein the logic interface is configured ~~enables the simulator user of the computer system~~ to develop logic using either a logic flow chart interface or a text-based logic code interface.

14. (*Cancelled*)

15. (*Currently amended*) The computer system of claim 1 wherein the object-oriented software is further configured to compile the object-oriented code into object-oriented facility management object code, to ~~and~~ link the object-oriented facility management object code to produce shared libraries, ~~thereby enabling~~ and to link ~~loading of~~ the shared libraries into the main simulation system.

16. (*Currently amended*) The computer system of claim 1 wherein the object-oriented software is further configured to compile the object-oriented code into object-oriented facility management object code, to ~~and~~ link the object-oriented facility management object code to produce dynamic linked libraries, ~~thereby enabling~~ and to combine ~~linking of~~ the dynamic linked libraries with ~~into~~ the main simulation system.

17. (*Previously presented*) The computer system of claim 1 wherein the object-oriented software is configured to execute the integrated simulation system by invoking the object-oriented facility management code at a plurality of timesteps during the simulation.

18. (*Previously presented*) The computer system of claim 17 wherein the object-oriented facility management code returns control back to the main simulation system after the facility management code has finished executing for a current timestep.

19. (*Currently amended*) The computer system of claim 1 wherein the processor comprises a plurality of connected processors to perform the simulation.

20. (*Currently amended*) A computer-implemented method of simulating a physical system comprising the steps of:

a) dynamically constructing logic to customize simulation of transport phenomena through a model of the physical system by a reservoir simulator user;

b) initiating simulation of transport phenomena through the model of the physical system by the reservoir simulator user causing initiation of the following steps without intervention of the reservoir simulator user:

i) automatically converting the logic into corresponding object-oriented code;

ii) integrating the object-oriented code with a ~~the~~ main simulation system which comprises a simulation data model and simulation algorithms, resulting in an integrated simulation system for simulating the physical system, wherein the converted object-oriented code extends the simulation data model by creating new classes that inherit from the simulation data model, and the object-oriented code is configured to call functions of the integrated simulation system and use member data of the integrated simulation system; and

iii) executing the integrated simulation system to simulate the physical system.

21. (*Original*) The method of claim 20 wherein the physical system comprises a hydrocarbon-bearing subterranean formation.

22. (*Original*) The method of claim 21 wherein the physical system comprises fluid-containing facilities associated with production of hydrocarbons from the hydrocarbon-bearing subterranean formation.

23. (*Original*) The method of claim 20 wherein construction of the logic comprises using a graphical user interface to perform at least one step chosen from:

a) selecting and using an existing logic;

b) selecting and modifying existing logic; and

c) developing new logic.

24. (*Original*) The method of claim 23 wherein construction of the logic produces a logic flow chart.

25. (*Original*) The method of claim 23 wherein construction of the logic produces a text-based logic code.

26. (*Previously presented*) The method of claim 24 wherein construction of the logic flow chart comprises using one or more of icons, arrows, menus, dialogs, toolbar buttons, and text to enable the reservoir simulator user of the computer system to build-up, edit and visualize facility management logic in the form of a flow chart.

27. (*Original*) The method of claim 25 wherein the construction of the logic flow chart comprises using text-based logic code interface comprising a graphical text editor useful for entering, modifying and deleting lines of alpha-numeric text.

28. (*Original*) The method of claim 20 wherein the conversion of the logic is to C++ code.

29. (*Canceled*)

30. (*Original*) The method of claim 20 wherein execution of the initiated simulation system generates results for predicting the overall behavior of the physical system.

31. (*Original*) The method of claim 20 wherein execution of the initiated simulation system is carried out using a plurality of connected processors.

32-42. (*Cancelled*)

43. (*New*) The computer system of claim 1 wherein the object-oriented software is configured to construct the model representing facilities associated with the physical system and the constructed logic controls the operation of modeled facilities in the model at a plurality of timesteps during the simulation.

44. (*New*) The computer system of claim 43 wherein the mechanical facilities comprises fluid-containing facilities associated with production of hydrocarbons from a hydrocarbon-bearing subterranean formation.

45. (*New*) The computer system of claim 1 wherein the physical system comprises a hydrocarbon-bearing subterranean formation.

46. (*New*) The method of claim 20 comprising the steps of constructing the model that represents a reservoir and facilities associated with the physical system, wherein the constructed logic controls the operation of modeled facilities in the model at a plurality of timesteps during the simulation.